IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Gelatos et al. Serial No: 10/792,054 Confirmation No: 4738 Filed: March 2, 2004 For: Heated Ceramic Substrate Support with Protective Coating	Group Art Unit 3742 Examiner: PAIK, Sang Yeop Attorney Docket No: 008682 USA/CPI/WCVD/LAP February 9, 2006 San Francisco, California

Board of Patent Appeals and Interference
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANT'S BRIEF (37 C.F.R. § 1.192)

This brief is in furtherance of the Notice of Appeal, filed on November 9, 2005.

The fees required under § 1.17(f), and any required petition for extension of time for filing this brief and fees therefore, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. § 1.192(a))

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APPENDIX

I. REAL PARTY IN INTEREST (37 C.F.R. § 1.192(c)(1))

The real party in interest in this appeal is Applied Materials Inc., 3050 Bowers Avenue, Santa Clara, California 95054.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 1.192(c)(2))

There are no other appeals or interferences known to Appellant, the Appellant's legal representative, or assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS (37 C.F.R. § 1.192(c)(3))

This appeal is taken from the final rejection mailed on June 9, 2005, in which the Examiner rejected pending claims 1-24. Claims 25-31 were previously withdrawn from consideration by the applicant. Claims 1-24 are pending in the application. Reconsideration of the present application in view of the arguments and remarks made herein is respectfully requested. All claims filed in Appellant's amendment on March 22, 2005, are on appeal in this case. All the pending claims are presented in Appendix A.

IV. STATUS OF AMENDMENTS (37 C.F.R. § 1.192(c)(4))

Original Claims 1-31 were filed on March 2, 2004.

On July 20, 2004, the Examiner, via telephone call, required restrictions to a single group of claims. Applicants elected the claims of Group 1, claims 1-24 as defined by the Examiner, without traverse.

After non-final rejection, an amendment was filed on March 22, 2005 and entered by the Examiner.

After final rejection, an amendment was filed on September 9, 2005, but this amendment was not entered by the Examiner.

The Examiner issued an Advisory Action on September 27, 2005, again rejecting the claims and arguments made in the previous amendment.

Therefore, the claims on appeal are claims 1-24 as amended in the amendments dated March 22, 2005 and presented in Appendix A.

V. SUMMARY OF INVENTION (37 C.F.R. § 1.192(c)(5))

Appellant has made an important discovery of a substrate support for a processing chamber, in which the ceramic block **28** of the substrate support **20** comprises a ceramic coating **40** to reduce the corrosion of the ceramic block **28** from corrosive gases present in a substrate processing chamber, such as halogen based-plasma. Corrosion occurs because energized gas used to process the substrate or clean the chamber can etch the ceramic block **28**. For example, an energized halogen gas, such as a chlorine-containing gas used to clean certain types of chambers is capable of etching many ceramics. Etching byproducts can be generated as deposits on chamber walls or particles within the chamber. These deposits can eventually peel and flake off the walls to generate particles that can fall into a substrate **21** and reduce the yield of devices or circuits being manufactured on the substrate **21**.

The substrate support **20** comprises a ceramic block **28** having a substrate receiving pocket **24** that is sized to receive a substrate **21** therein, a peripheral ledge **23** extending about the substrate pocket **24**, and side surfaces. A ceramic coating **40** covers the substrate pocket **24** and peripheral ledge **23** of the

ceramic block **28**. A resistance heater **32** is in the ceramic block **28** and heater leads **34** extend out of the ceramic block **28** to conduct electrical power to the resistance heater **32**.

The substrate support **20** comprises a protective ceramic coating **40** over the ceramic block **28**. As explained in the Specification, the coating **40** is composed of a material that is selected so that even though the material is eroded by the corrosive process gas, the erosion byproducts of the coating **40** are volatile products that do not condense on the chamber surfaces to form deposits on the chamber walls or gas phase nucleated particles within the chamber. The coating **40** essentially transforms from the solid phase to a volatile gas phase, which is then exhausted by the vacuum pumps of the chamber. This solves the problem of contaminating deposits and particles because the coating **40** does not contribute condensable species that form deposits and particles in the chamber. For example, when the coating **40** comprises amorphous Si-H-N-O compound (Claim 1) or silicon nitride compound (Claim 11) or either (Claim 18), the byproducts of silicon nitride eroded by a corrosive energized chlorine gas atmosphere are exhausted through a gas outlet of the chamber and do not remain as deposits or particles in the chamber. Thus, the coating performs as a sacrificial layer that protects the underlying ceramic material from the erosive gaseous environment.

In one version, the ceramic block **28** is composed of a first ceramic material and the ceramic coating **40** is composed of a second ceramic material. The block further comprises a gas energizer electrode (Claim 18). In this version, the coating is even more necessary to prevent corrosion of the ceramic block because the electrode energizes the gas causing energetic ions to impinge upon the support **20** further exacerbating the corrosion problem.

VI. ISSUES (37 C.F.R. § 1.192(c)(6))

1. Whether claims 1-5, 7, 8, 11-15 are unpatentable under 35 U.S.C. 103(a) over Chen et al. (USP 6,423,949) in view of Chang (USP 5,916,370) or Berkman et al. (USP 4,090,851), and Brown et al. (USP 6,046,758) or Todd (US 6,630,413).

2. Whether claims 6, 9 and 16 are unpatentable under 35 USC 103(a) over Chen in view of Chang or Beckman, and Brown or Todd as applied to claims 1-5, 7, 8, 11-15 and 17 above, and further in view of Burkhart et al. (US 6,469,283) or Tachikawa et al. (US 6,376,808).

3. Whether claims 10, 18-24 are unpatentable under 35 U.S.C. 103(a) over Chen in view of Chang or Berkman, and Brown or Todd as applied to claims 1-5, 7, 8, 11-15 and 17 above, and further in view of Ishii (US 5,851,298) or Hwang (US 6,009,831).

VII. GROUPING OF CLAIMS (37 C.F.R. § 1.192(c)(7))

Group 1 - Claims 1-24.
Group 2 - Claims 25-31.

For each ground of rejection which appellant contests herein which applies to more than one claim, such additional claims, to the extent separately identified and argued below, do not stand or fall together.

In particular, the claims of Groups 1 and 2 do not stand or fall together for the reasons provided in the arguments below.

VIII. ARGUMENTS

A. THE REJECTIONS UNDER 35 U.S.C. §103(a) OF CLAIMS 1-5, 7,8, 11-15, AND 17 OVER *CHEN ET AL* IN VIEW OF *CHANG* OR *BERKMAN ET AL* , AND *BROWN ET AL* OR *TODD* SHOULD BE REVERSED.

Claims 1-10

As amended, claim 1 is to, inter alia, a substrate support for substrate processing chamber, the substrate support comprising a ceramic block having a substrate receiving pocket, a ceramic coating comprising an amorphous Si-H-N-O compound, a resistance heater in the ceramic block, and heater leads extending out of the ceramic block to conduct electrical power to the resistance heater.

Chen et al. does not way teach or suggest the use of a coating on a ceramic block having a heater. The Examiner specifically acknowledged that Chen et al. "does not show the claimed ceramic coating comprising an amorphous Si-H-N-O compound." In fact, Chen et al. teaches that a susceptor having an exposed surface of AlN without any coating works fine in a plasma environment. (Col. 7, lines 50-60.) Thus, Chen et al. would not motivate one of ordinary skill to seek a coating for the disclosed AlN susceptor because there is no teaching that the exposed AlN surface has any problems or that a coating is desirable. Consequently, one of ordinary skill would not be motivated to seek other references that teach the use of a protective coating; such as the Chang and Berkman et al. references.

Chang teaches a susceptor having a protective diamond film coating. This does not support a rejection of claims to a support with a coating of amorphous Si-H-N-O compound. Neither Chen et al. nor Chang teach or suggest the claimed amorphous Si-H-N-O compound coating as claimed in Claim 1. A teaching that a diamond film provides a protective function does not motivate one of ordinary skill to apply a coating

of amorphous Si-H-N-O compound. Thus, because Chen et al, does not suggest that any coating is needed for a ceramic block, and because Chang teaches a different coating than the one claimed, the combination of the two references simply does not support an obviousness rejection. Chang does not cure the deficiencies of Chen et al. to the absence of any coating motivation, and does not teach or suggest the claimed coating.

Furthermore, instead of teaching that a Si-H-N-O compound coating is desirable, Chang teaches away from the present claims by teaching that exposed silicon nitride is undesirable in the chamber because "the silicon nitride may flake and introduce unwanted particulates into the processing chamber." (Col. 1 lines 39-41.) Thus, Chang teaches away from a protective coating of amorphous Si-H-N-O compound as claimed in Claim 1. A reference that teaches against the claimed invention should not be relied upon to establish a prima facie obviousness rejection.

Furthermore, Chang does not teach a ceramic block that includes a resistance heater or heater leads extending out of the ceramic block to conduct electrical power to the resistance heater. Instead, Chang teaches an annular pre-heat ring made of silicon carbide coated with graphite or quartz, but the annular pre-heat ring does not include a resistance heater or have heater leads extending out of a ceramic block. The heater by heating the support also exacerbates the common problem which the Applicant is solving by use of the claimed protective Si-H-N-O coating. This is not taught by the cited references.

Berkman et al. is non-analogous art because Berkman et al. teaches the art of forming die crucibles, which is non-analogous to the art of substrate supports for substrate processing chambers. Thus, Berkman's teachings to a protective coating of silicon nitride over a ceramic die crucible do not cure the deficiency of a lack of disclosure of the need for a coating in Chen et al., and more specifically to the claimed amorphous Si-H-N-O compound on a substrate support for a substrate processing

chamber. Thus, Chen et al. does not motivate one to seek any protective coating. Chang teaches against the claimed amorphous Si-H-N-O compound. Berkman teaches coatings for an entirely different art than a substrate support for a substrate processing chambers. Thus Berkman does not cure the deficiencies of Chen et al..

Brown et al. is also non-analogous art because Brown et al. teaches wear resistant thermal print heads with silicon-doped diamond-like carbon protective coatings. (Abstract.) Reduce wear in a thermal print head is non-analogous to reducing contamination from a substrate support for substrate processing chamber. The thermal print head is used to print images in paper and related media. One of ordinary skill in the art would not be motivated to use a coating used to reduce wear in a thermal print head to reduce contamination from a substrate support for substrate processing chamber. Not only are the technical fields different, but the end applications of reducing wear versus reducing contamination are also completely different. Furthermore, the print head is not a substrate support and does not have a substrate-receiving pocket that is sized to receive a substrate. Thus, Brown et al., also does not support an obviousness rejection over Chen et al., in view of Chang or Berkman et al.. Chen et al. does not recognize or teach the need for a protective coating on a substrate support, Chang teaches away from the invention, Berkman et al. is non-analogous art, and Brown teaches coatings for a thermal print head to reduce wear, which is not the same application as reducing contamination in a clean room environment. Therefore, derivation of the claimed invention from this combination is not a prima facie obviousness rejection.

Todd also does not make up for the deficiencies of the cited references. Todd generally teaches CVD synthesis of silicon nitride materials containing low hydrogen content by CVD to make micro electronic devices such as integrated circuits. (Column 2, lines 55-67.) However, Todd provides no teaching or motivation to apply an amorphous protective coating comprising Si-H-N-O compound to a substrate support for substrate processing chamber for the purpose of reducing contamination of the

substrate placed on the chamber as taught in the instant Specification. A teaching to a method of fabricating a type of coating is not a teaching to a component comprising a coating used for a particular application, reduction of contamination in this instance, as claimed. Thus, Todd et al also does not teach or suggest the instant claims, in combination with Chen et al, in view of Chang or Berkman et al.

Claims 11-15 and 17

Claim 11 is to, inter alia, a substrate support comprising a ceramic block having a substrate receiving pocket, a silicon nitride compound coating covering the substrate pocket and peripheral ledge of the block; a resistance heater in the block; and heater leads extending out of the block to conduct electrical power to the resistance heater.

Chen et al. does not teach a silicon nitride compound coating covering a substrate-receiving pocket of a ceramic block. Chen et al. does not teach or suggest that a coating is desirable. Nor does Chen et al. teach that a coating may be used to reduce contamination from a substrate support as disclosed in the present Specification. Furthermore, Chen et al. provides no mention of the claimed silicon nitride compound coating. Thus, one of ordinary skill in the art would not be motivated to seek coating references to apply to the substrate support taught by Chen et al.

Chang does not support the deficiencies of Chen et al., because Chang also does not disclose a substrate support comprising a silicon nitride compound coating on a ceramic block. In contrast, Chang teaches that exposed silicon nitride is undesirable in the chamber because "the silicon nitride may flake and introduce unwanted particulates into the processing chamber." (Col. 1 lines 39-41.) Thus, Chang teaches against a protective coating of silicon nitride compound as claimed. Instead, Chang discloses a totally different coating; a diamond coating. Furthermore, Chang does not teach a ceramic block that includes the resistance heater or heater leads

extending out of the ceramic block. Therefore, Chang should not be relied upon in this obviousness rejection.

Berkman's teachings apply to ceramic die crucible art which is non-analogous art. As the art of forming die crucibles is non-analogous to the art of substrate supports for substrate processing chambers, one of ordinary skill in the art would not seek out literature for the fabrication of die crucibles to solve a contamination problem in a substrate processing chamber. Furthermore, Chen et al. provides no reason to seek coating art. Consequently, Berkman should not be used to cure the deficiencies of Chen et al..

Brown et al. is also non-analogous art because Brown et al. teaches wear resistant thermal print heads used to print images in paper and related media. A thermal print head is non-analogous art to a substrate support for a substrate-processing chamber. Furthermore, the print head does not have a substrate-receiving pocket that is sized to receive a substrate therein. One of ordinary skill in the art would not be motivated to use a coating used to reduce wear in a thermal print head to the art of reducing contamination from a pocket of a substrate support for a substrate processing chamber. Not only are the technical fields different, but the end application of reducing wear versus reducing contamination are also totally different. Further, Brown et al. teaches silicon-doped diamond-like carbon protective coatings not the claimed silicon nitride compound coating. Thus, Brown et al., also does not cure the deficiencies of Chen et al in view of Chang or Berkman et al.

Todd teaches CVD synthesis of silicon nitride materials having low hydrogen content in microelectronics manufacture, and provides no teaching or motivation to apply a silicon nitride compound coating to a substrate support for a substrate processing chamber to reduce contamination of a substrate. A teaching to a method of fabricating a type of coating by CVD in the fabrication of IC chips, is not a teaching that can be applied to render obvious a substrate support component

comprising a coating used to reduce contamination to hold a substrate. The reference provides no motivation or teaching that would cause one of ordinary skill in the art to apply the taught CVD method to the substrate support being claimed. Thus, Todd et al also does not teach or suggest the instant claims, or make up for the deficiencies of Chen et al. in view of Chang or Berkman et al..

For these reasons, claims 1-5, 7, 8, 11-15 and 17 and not obvious over the cited combination of Chen et al. in view of Chang or Berkman et al., and Brown et al. or Todd. The Board is respectfully requested to reverse this rejection.

B. THE REJECTIONS UNDER 35 U.S.C.§103(a) OF CLAIMS 6, 9, and 16 OVER *CHEN ET AL* IN VIEW OF *CHANG* OR *BERKMAN, BROWN* OR *TODD* AS APPLIED TO CLAIMS 1-5, 7, 8, 11-15 AND 17, AND FURTHER IN VIEW OF *BURKHART ET AL* OR *TACHIKAWA ET AL* SHOULD BE REVERSED.

Claims 6, 9, and 16

The rejected claims 6, 9, and 16 are dependent upon parent claims 1 and 11. As explained above, the primary Chen et al. reference does not teach the claimed ceramic block with a ceramic coating comprising an amorphous Si-H-N-O compound, or the claimed ceramic block of claim 11 with a silicon nitride compound coating. Chen et al. provides no motivation to apply a coating to an exposed ceramic block, and teaches that such a block can be used without problems in substrate fabrication, so Chen et al. motivates against use of a coating.

Chang makes no mention of the claimed amorphous Si-H-N-O compound of claim 1, or the claimed silicon nitride compound coating of claim 11, and instead teaches a diamond film coating. Chang also teaches against use of a protective coating comprising silicon nitride. Thus, Chang does not cure the deficiencies of Chen et al.

Berkman's teachings to a protective coating of silicon nitride over a ceramic die crucible do not cure the deficiency of the lack of disclosure in Chen et al. because forming die crucibles is non-analogous art to the fabrication of substrate supports for substrate processing chambers.

Brown et al. also teaches a non-analogous art that comprises the fabrication of wear resistant thermal print heads with silicon-doped diamond-like carbon protective coatings. One of ordinary skill in the art would not seek coatings used to reduce wear in a thermal print head to reduce contamination from a substrate support for substrate processing chamber. Thus, Brown does not cure the deficiencies of Chen et al. in view of Chang or Berkman.

Todd generally teaches CVD synthesis of silicon nitride materials having low hydrogen content in the manufacture of micro electronic devices. Todd provides no teaching or motivation to apply an amorphous protective coating comprising Si-H-N-O compound as in claim 1, or a silicon nitride compound coating as in claim 11, to a substrate support for substrate processing chamber to reduce contamination of the substrate placed on the chamber. Thus, Todd also does not cure the deficiencies of Chen et al. in view of Chang or Berkman.

Burkhart et al. does not cure the deficiencies of the Chen in view of Chang or Beckman, and Brown or Todd, because Burkhart et al. makes no mention of a protective coating for the heater. Further, Burkhart et al. does not teach or suggest the claimed ceramic coating comprising an amorphous Si-H-N-O compound or a silicon nitride compound coating on a ceramic block of a substrate support. Thus, Burkhart et al. does not provide the motivation to combine the disclosed heater with a protective coating used in the manufacture of a thermal print head as taught by Brown et al., nor a micro electronic device as taught by Todd.

Tachikawa et al. does not cure the deficiencies of Chen in view of Chang

or Beckman, and Brown or Todd, because Tachikawa et al. teaches a heating apparatus having a heater and an electrode, but does not teach or suggest the claimed ceramic coating comprising an amorphous Si-H-N-O compound (claim 1), or a silicon nitride compound coating (Claim 11), on a ceramic block comprising a resistant heater as claimed. Nor does Tachikawa et al. teach any motivation to provide the ceramic coating comprising amorphous Si-H-N-O compound, or silicon nitride compound, on a heating apparatus. Thus, Tachikawa et al. does not render the present claims obvious with respect to Chen et al. in view of Chang or Beckman, and Brown or Todd.

For these reasons, the Board is respectfully requested to reverse the rejection of claims 6, 9 and 16.

C. THE REJECTIONS UNDER 35 U.S.C. §103(a) OF CLAIMS 10 AND 18-24 OVER *CHEN* IN VIEW OF *CHANG* OR *BERKMAN*, AND *BROWN* OR *TODD* AS APPLIED TO CLAIMS 1-5, 7,8 11-15, AND 17, AND FURTHER IN VIEW OF *ISHII* OR *HWANG* SHOULD BE REVERSED.

Claim 10

Rejected claim 10 is dependent upon parent claim 1, which recites, inter alia, a substrate support comprising a ceramic block with a ceramic coating comprising an amorphous Si-H-N-O compound, a resistance heater in the ceramic block, and heater leads extending out of the ceramic block to conduct electrical power to the resistance heater.

Chen et al. does not teach the claimed ceramic block of claim 1 with a ceramic coating comprising an amorphous Si-H-N-O compound, or suggest the desirability of a coating. Chang also makes no mention of the claimed amorphous Si-H-N-O compound and instead teaches a diamond film coating. Berkman's teachings to a protective coating of silicon nitride over a ceramic die crucible do not cure the

deficiency of the lack of disclosure in Chen et al. or Chang, because forming die crucibles is non-analogous art to the fabrication of substrate supports for substrate processing chambers. Brown et al. teaches wear resistant thermal print heads with silicon-doped diamond-like carbon protective coatings, which is also non-analogous art to a substrate support for a substrate-processing chamber. Todd generally teaches CVD synthesis of silicon nitride materials having low hydrogen content in the manufacture of micro electronic devices and provides no teaching or motivation to apply an amorphous protective coating comprising Si-H-N-O compound to a substrate support for substrate processing chamber.

Ishii teaches a heating apparatus having a heater and an electrode; however, Ishii does not teach or suggest the claimed ceramic coating comprising an amorphous Si-H-N-O compound. Similarly, Hwang teaches a heating apparatus having a heater and an electrode; however, Hwang also does not teach or suggest the claimed ceramic coating comprising an amorphous Si-H-N-O compound.

Thus, the cited rejection of claim 10 based on Chen in view of Chang or Berkman, and Brown or Todd as applied to claims 1-5, 7, 8, 11-15 and 17, and further in view of Ishii or Hwang, should be reversed by the Board.

Claims 18-24

Claim 18 is to, inter alia, a substrate support for a substrate processing chamber, the substrate support comprising a block comprising a first ceramic and which has a substrate receiving pocket sized to receive a substrate, a peripheral ledge extending about the substrate receiving pocket, and side surfaces. A coating comprising a second ceramic that is a different ceramic than the first ceramic covers the substrate pocket and peripheral ledge. The second ceramic comprises an amorphous Si-H-N-O compound or silicon nitride compound. A resistance heater and gas energizer electrode are in the block, and electrode leads extend out of the block to

conduct power to the resistance heater and gas energizer electrode.

Chen et al. does not teach a support comprising a block, comprising a first ceramic and having a coating comprising a second ceramic that is a different ceramic than the first ceramic, the second coating comprising an amorphous Si-H-N-O compound or a silicon nitride compound. Chen et al. provides no teaching to the desirability of the claimed coatings or even that a coating is needed at all. Further, Chen et al. does not teach a ceramic block composed of a first ceramic with a second ceramic coating. As acknowledged by the Examiner, Chen et al. also does not teach a second ceramic comprising an amorphous Si-H-N-O compound or a silicon nitride compound coating to reduce contamination arising from a first ceramic. In fact, Chen et al. provides no teaching a suggestion that a coating is desirable.

Chang does not support the deficiencies of Chen et al. because Chang also does not disclose a ceramic block comprising a first ceramic, nor does it teach having a coating of a second ceramic comprising an amorphous Si-H-N-O or silicon nitride compound. Chang discloses a diamond coating on the body of a susceptor. Chang further teaches against a coating of silicon nitride by teaching that silicon nitride contaminates the chamber and has to be cleaned off the chamber walls. Moreover, Chang does not teach a ceramic block that includes the resistance heater or heater leads extending out of the ceramic block to conduct electrical power to the resistance heater.

Berkman's teachings to a protective coating of silicon nitride over a ceramic die crucible do not cure the deficiency of the lack of motivation to seek a coating based on Chen et al. The art of forming die crucibles is non-analogous to the art of substrate supports for substrate processing chambers, thus, one of ordinary skill in the art would not seek out literature for the fabrication of die crucibles to cure a contamination problem in a substrate processing chamber.

Brown et al. teaches wear resistant thermal print heads with silicon-doped diamond-like carbon protective coatings that are used to print images in paper and related media. Thermal print head technology is also non-analogous art to the claimed substrate support for a substrate-processing chamber.

Todd generally teaches CVD synthesis of silicon nitride materials containing low hydrogen content in microelectronics manufacture. However, Todd provides no teaching or motivation to apply a silicon nitride compound coating to a substrate support for a substrate processing chamber to reduce contamination of the substrate placed on the support in the chamber. Thus, Todd et al also does not teach or suggest the instant claims.

Ishii teaches a heating apparatus having a heater and an electrode. However, Ishii does not teach or suggest the claimed substrate support comprising a block of a first ceramic with a coating of the second ceramic that is a different ceramic and that comprises amorphous Si-H-N-O compound or silicon nitride compound.

Hwang also teaches a heating apparatus having a heater and an electrode. However, Hwang also does not teach or suggest the claimed substrate support comprising a block of a first ceramic with a coating of the second ceramic that is a different ceramic and that comprises amorphous Si-H-N-O compound or silicon nitride compound.

For these reasons, claims 18 to 24 are not obvious over the cited combination of Chen et al. in view of Chang or Berkman et al., and Brown et al. or Todd and further in view of Ishii or Hwang. Thus, the Board is respectfully requested to reverse this rejection.

CONCLUSION

For the foregoing reasons, the rejection under 35 U.S.C. §103 should be reversed by the Board, and all of the claims presented should be allowed.

Respectfully submitted,

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APPENDIX A

CLAIMS (37 C.F.R. § 1.192(c)(9))

The text of the claims involved in the appeal are:

1. A substrate support for a substrate processing chamber, the substrate support comprising:

(a) a ceramic block having a substrate receiving pocket that is sized to receive a substrate therein, a peripheral ledge extending about the substrate receiving pocket, and side surfaces;

(b) a ceramic coating covering the substrate pocket and peripheral ledge of the ceramic block, the ceramic coating comprising an amorphous Si-H-N-O compound;

(c) a resistance heater in the ceramic block; and

(d) heater leads extending out of the ceramic block to conduct electrical power to the resistance heater.

2. A support according to claim 1 wherein the amorphous Si-H-N-O compound comprises a silicon content of about 30 wt% to about 50 wt% and a nitrogen content of about 20 wt% to about 40 wt%..

3. A support according to claim 1 wherein the amorphous Si-H-N-O compound comprises a hydrogen content of about 2 wt% to about 30 wt% and an oxygen content of about 1 wt% to about 5 wt%.

4. A support according to claim 1 wherein the ceramic coating comprise a thickness of about 0.1 microns to about 15 microns.

5. A support according to claim 1 wherein the ceramic block is composed of aluminum nitride.

6. A support according to claim 1 comprises an electrode in the ceramic block and an electrode lead extending out of the ceramic block.

7. A support according to claim 1 wherein the resistance heater comprises an electrical conductor having an electrical resistance of about 2.5 ohms to about 5 ohms.

8. A support according to claim 1 wherein the resistance heater comprises a plurality of independently controllable resistive heating elements.

9. A support according to claim 6 comprising a post extending downwardly from the center of the ceramic block, and wherein the heater leads and the electrode lead extend at least partially through the post.

10. A substrate processing apparatus comprising the substrate support of claim 1, the apparatus comprising:

(1) a process chamber comprising enclosing walls, the substrate support of claim 1, a gas distributor, a gas exhaust, and a gas energizer;

(2) a heater power supply to provide a power at a power level of at least about 1000 watts, to the resistance heater; and

(3) a controller comprising program code to provide instructions to the heater power supply to supply the power having the power level to the resistance heater,

whereby the controller controls the power delivered to the resistance heater by the heater power supply.

11. A substrate support for a substrate processing chamber, the substrate support comprising:

(a) a ceramic block having a substrate receiving pocket that is sized to receive a substrate therein, a peripheral ledge extending about the substrate receiving pocket, and side surfaces;

(b) a silicon nitride compound coating covering the substrate pocket and peripheral ledge of the block;

(c) a resistance heater in the block; and

(d) heater leads extending out of the block to conduct electrical power to the resistance heater.

12. A support according to claim 11 wherein the silicon nitride compound coating is amorphous.

13. A support according to claim 11, wherein the silicon nitride compound coating comprises a silicon content of from about 30 wt% to about 50 wt% and a nitrogen content of from about 20 wt% to about 40 wt%.

14. A support according to claim 11 wherein the silicon nitride compound coating comprises hydrogen and oxygen.

15. A support according to claim 14 wherein the silicon nitride compound coating comprises a hydrogen content of about 2 wt% to about 30 wt% and an oxygen of about 1 wt% to about 5 wt%.

16. A support according to claim 11 comprising an electrode in the ceramic block and an electrode lead extending out of the ceramic block.

17. A support according to claim 11 wherein the resistance heater comprises a plurality of independently controllable resistive heating elements.

18. A substrate support for a substrate processing chamber, the substrate support comprising:

(a) a block comprising a first ceramic, the block having a substrate receiving pocket that is sized to receive a substrate therein, a peripheral ledge extending about the substrate receiving pocket, and side surfaces;

(b) a coating comprising a second ceramic that is a different ceramic than the first ceramic, the coating covering the substrate pocket and peripheral ledge of the block, and the second ceramic comprising an amorphous Si-H-N-O compound or silicon nitride compound;

(c) a resistance heater in the block;

(d) a gas energizer electrode in the block; and

(e) heater and electrode leads extending out of the block to conduct power to the resistance heater and gas energizer electrode, respectively.

19. A support according to claim 18 wherein the second ceramic consists essentially of a silicon nitride compound.

20. A support according to claim 19 wherein the silicon nitride compound is amorphous.

21. A support according to claim 19 wherein the silicon nitride compound comprises a silicon content of from about 30 wt% to about 50 wt% and an nitrogen content of from about 20 wt% to about 40 wt%.

22. A support according to claim 18 wherein the second ceramic consists essentially of an amorphous Si-H-N-O compound.

23. A support according to claim 22 wherein the amorphous Si-H-N-O compound comprises a silicon content of about 2 wt% to about 30 wt% and an oxygen content of about 1 wt% to about 5 wt%.

24. A support according to claim 18 wherein the resistance heater comprises a plurality of independently controllable resistive heating elements.

APPENDIX B

CHEN ET AL. PATENT (U.S. No. 6,423,949)

APPENDIX C

CHANG ET AL. PATENT (U.S. No. 5,916,370)

APPENDIX D

BERKMAN ET AL. PATENT (U.S. No. 4,090,851)

APPENDIX E

BROWN ET AL. PATENT (U.S. No. 6,046,758)

APPENDIX F
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TACHIKAWA ET AL. PATENT (U.S. No. 6,376,808)

APPENDIX I
ISHII PATENT (U.S. No. 5,851,298)

APPENDIX J
HWANG PATENT (U.S. No. 6,009,831)